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Sent: 31 October 2022 02:50
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Subject: Two high PFAS exposure health studies show little cause for health concerns

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Hello [REDACTED] and Bjorn,

I hope this finds you both well.

I thought it important that you both, and other colleagues involved in PFAS decision-making, see these 2 major health study reports on PFAS (in case not seen already), for consideration.

1. A Dec. 2021 Australian National University Reports on PFAS exposure impacts in 3 Australian communities heavily impacted by contamination from AFFF training use at nearby Defence bases, Oakey QLD; Williamstown NSW; and Katherine NT.

It concluded "***The [PFAS] effects are small and unlikely to lead to poor health outcomes.***" It highlighted "***people living in all three PFAS affected communities, irrespective of PFAS serum concentrations were more likely to have experienced psychological distress than those who lived in comparison communities. ...The evidence for other adverse health outcomes was limited. For most health outcomes studied, findings were consistent with previous studies that have not identified contributing links between PFAS and health.***" It found "***There was limited evidence to support a contributing link between PFAS exposure and most adverse health outcomes included in the study. For most of these outcomes, the differences in rates between PFAS affected and comparison communities were relatively small.***"

It also confirmed PFHxA and 6:2 FTS were not detected in blood serum from any exposed community members, or comparative communities. Psychological distress presumably derived from anxiety and worry that their health would be severely impacted, based on 'media-hype', 'blighted' property values, contaminated drinking water, and fear of family harm.

2. A 2020 University of Queensland (QLD) study of 799 Australian Aviation Rescue and Firefighting Services (ARFFS) personnel's exposure to PerfluoroAlkyl Acids (PFAAs, a subset of PFAS) and potential resulting health impacts.

It concluded "***Overall, the associations that were found were relatively small and did not result in an increased risk of out-of-range (potentially abnormal) values across the serum PFAA concentrations in this study.***" This longitudinal study confirmed no significant associations over time in cholesterol (HDL, LDL) or urate with PFAS concentrations. Also observing "***PFOA concentrations similar to general population, indicating no increased exposure through occupational activities to this chemical.***"

Blood serum levels of 40 PFAS were recorded (incl. PFHxA, PFBA, 10:2, 8:2, 6:2 and 4:2 FTS), most of which were not detected, or in less than 15% of participants, so justified no further study. **Only 6 PFAS were found in 90% of participant's serum (studied closely) ie. PFOA, PFNA, PFDA, PFHxS, PFHpS & PFOS - all legacy long-chain C8PFAS, already restricted from use and not**

manufactured. The last 3 strongly correlated with pre-2005 Lightwater AFFF use. 3 other PFAS were found at lower levels (PFUnDA 30%; PFHpA 29% and PFBS 16% participant's serum). Serum concentration comparisons for these 130 ARFFS participants between 2013 and 2019 showed average decreases of 58%PFOA, 42%PFHxS, 45%PFHpS and 49%PFOS.

This study found participants starting work pre-2005 had higher PFOS, PFHxS and PFHpS levels than Australia's population generally (as expected). Those starting post-2005 had concentrations similar to the general population.

Other research of concern may justify 're-balancing' to keep people safe and save more lives?

The evidence from five rigorous comparative fire test series using gasoline is disturbing, ...the most recent from EU.

2022 Swedish Research Institute (RISE) fire testing at 'room temperature' concluded *"None of the [eleven F3] products in the study met the fire test performance requirements in all the referenced standards [ICAO Level B, EN1568-3, IMO Marine approvals]. Instead, the products seem to have different niches where they perform best eg. types of fuel and water. **This highlights the importance of testing in an environment as close to reality as possible.**"* Relying on fire test approvals like ICAO level B, EN1568-3, UL162, Lastfire ISO7203-1, IMO may be inadequate, especially since they mostly use Heptane as the test fuel, under 'ideal conditions'. Safety factors are based on AFFFs and may not be adequate for more vulnerable F3s?

Surely re-balancing acceptable risks using scientific evidence could/should avoid potential failures when extinguishing challenging flammable liquid fires?

I am seriously worried this is a 'ticking time-bomb' waiting for a major fire to explode in catastrophic results with many lives lost, perhaps unnecessarily, before realising we are not adequately considering the vulnerabilities of F3s which are unable to protect lives as we 'anticipate, wish or expect' from many larger fire situations. We've already witnessed two disastrous fires where F3 was used, including a lost life (Dubai 2016 Boeing 777 which burned for 16 hours and Melbourne 2018 - Footscray chemical factory fire where over 2,000 fish were killed along with the creek - still undergoing remediation 18 months later).

Research evidence and comparative fire testing re-inforces that C6 foams remain the most reliable, most effective life saving response to major fires.

C6 PFAS are not categorised bioaccumulative, nor toxic and prevent excessive smoke and runoff from polluting our environment and causing harm to human health. Many PAH & VOC breakdown products in smoke and runoff are known carcinogens eg. Benzene, Formaldehyde, benzo a pyrene, etc.

A 2019 study reported dermal absorption through skin as an important source of firefighter carcinogen exposure, even when Self Contained Breathing Apparatus (SCBA) is worn during structural fires (where Class B foams not normally used). It concluded *"Thus, the findings here support previous work suggesting that dermal absorption plays an important role in the accumulation of toxicants during firefighting."* and **"Several studies have documented increased excretion of PAH and/or benzene metabolites in urine or breath following structural firefighting."** Continuing *"Firefighters' exposure to chemical carcinogens, particularly those associated with by-products of combustion, has been postulated as a contributor to this increased risk".* Smoke seems an under-rated killer of firefighters, casualties and nearby communities.

Best regards,

